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APPLIED MATHEMATICIAN L. MAHADEVAN | MEETING THE MINDS

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Simple curiosities compel scientist

By Billy Baker, Globe Correspondent | October 6, 2008

L. Mahadevan smiled at the question, which was: "What, exactly, do you do?" It is, on the surface, a simple question, but for Mahadevan the answer could lead many places. Or, maybe, that's the answer, that Mahadevan, a 43-year-old professor at Harvard, studies seemingly simple, everyday questions - such as, how does fabric drape? paper wrinkle? paint dry? -and hopes that they may lead to new places in science.

"I'm a wanderer," Mahadevan said. "I tend to be maybe too curious about too many things. And most of the time I fail in satisfying that curiosity. But," he said, as he raised the eyebrows on his boyish face, "one curiosity leads to another."

Harvard lists Mahadevan as a professor of applied mathematics. But he's also a physicist. And an engineer. And he holds appointments in Harvard's biology department. He is, he finally concludes, "just a scientist," whose interest is a world where "everything is a puzzle of why and how and what."

Take one of his latest riddles: the physics of walking a slackline. Mahadevan happened to read an article about the sport - a slackline is a cousin of the circus tightrope, but the line is flat and slack and the tension on the line is provided by the weight of the walker - and then watched a YouTube video and then. . . last week, the chalkboard in his office was filled with equations.

"What is that you're responding to that allows you to keep your balance? What are the parameters that control that stability?" he asked as he rocked from side to side. "Where does it lead to? I don't know. I just know that it's an interesting question. I don't think too much about practical applications."

Joseph Keller - a professor of mathematics and engineering at Stanford who was Mahadevan's adviser and role model, he says, in the attempt to try and explain everything - remembers that Mahadevan spent so much time jumping between interests that he had to force him to focus if he was ever going to get his doctorate.

"In some sense, he's like many Renaissance scientists," Keller said. "In those days, there wasn't the extreme specialization we have now. They did whatever they had to do to understand the problems that interested them. And that's what he's doing now. He's really a star in a number of different areas."

Mahadevan finds a parallel between his wandering life and his roving existence. He grew up all over the place in India, and since joining academia he's bounced around the egghead capitals of the world, from Stanford to MIT to Cambridge University in England to Harvard. This is how he likes it, constantly moving, finding some small glimpse of knowledge that is portable, that he can take with him to his next riddle. "One could work on a problem for a long time, or one could wander. I'm not an expert on anything," he said. This "diffused" label, he thinks, is an advantage; it protects him from expectations.

Last fall, Mahadevan received a bit of publicity when he concluded that a flying carpet was theoretically possible. At least that's how the media cast it; in reality, he explains as he picks up a piece of paper and drops it so it glides across a desk, he was exploring the why and how and what of that particular action. And he's turned his recent focus - at least "focus" in the Mahadevan sense - to morphogenesis, the study of how shapes arise, such as the shape of a leaf.

"I'm into plants right now because they've solved a lot of problems," he said. "They've learned a lot. They can adapt without being able to move around. If I'm a problem solver, I want to figure out how other organisms solve problems." He said his ideas come to him late at night when it's quiet. Or lying in bed just before he goes to sleep. Or at classical music concerts. Or. . . OK, it happens everywhere.

"One doesn't have to look too hard around to find interesting questions, beautiful questions," he said as he glanced around his office, his face carrying the certainty that he could find another beautiful problem if he just looked. In some sense, Mahadevan admits that his curiosity is a bit uncontrolled. His children, he said with a big smile, think he's very, very weird. "Curiosity is a dirty word sometimes," he said. "But when you stop being curious, you stop learning."

Recently, he found a book in a secondhand bookstore called "The Encyclopedia of Ignorance" and just had to buy it. "I was surprised to see how thin it was! We know a lot less than we think we do. "

Fact sheet

Hometown: Born in New Delhi; lives in Brookline.

Education: Earned an undergraduate degree in engineering from the India Institute of Technology in 1986 and a master's in engineering mechanics from the University of Texas-Austin, in 1987, before moving to Stanford, where he earned a master's in mathematics in 1992 and a Ph.D in applied mathematics in 1995.

Family: Wife, Amala Mahadevan, is an oceanography professor. They have a daughter, Kausalya, 12, and a son, Aditya, 9.

Hobbies: Reading "about everything," but especially history, travel, and scientific biography; and "goofing around with the kids doing baby science experiments with them, and sometimes on them, but usually with them." ■

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